EXECUTIVE SUMMARY

The South Fork Noyo River (SFNR) watershed in northern coastal California has been heavily impacted by widespread clearcut logging over the last century. As a consequence, large volumes of sediment have been delivered to watercourses within the basin. Historically, large populations of anadromous fish reproduced in the river. However, drastically declining fish populations over the past several decades has raised concerns over the cumulative impacts of sediment on water quality, fish habitat, and the aquatic environment. In 1999, the U.S. Environmental Protection Agency established a Total Maximum Daily Load (TMDL) for the SFNR, and determined sediment loading allocations aimed at improving water quality criteria for sediment. The EPA acknowledged that the office-based sediment budget assessments used in the TMDL were incompatable with field geomorphic relations. Prior to this study, very little data existed on sediment storage volumes and transport rates in the SFNR.

The overall goal of this assessment was to use field mapping and data collection techniques to assess long- and short-term sediment storage and transport within the SFNR. Specific objectives of this investigation were to collect baseline data on the volume of sediment stored and transported within the SFNR watershed over the past approximately 110 years and to collect present-day stream flow and sediment transport data from the main stem SFNR and its major tributaries. This effort provides better data for calculating the sediment budget of the watershed and contributes to the evaluation of how forest management practices have affected the past and present distribution of sediment within the basin.

In this study, we performed detailed geologic mapping and surveying to quantify the volumes of sediment associated with pre-historic terraces, historic terraces, and the active channel along four stream reaches. We also collected reconnaissance-level data along three stream reaches in the South Fork Noyo River watershed. These stream reaches were selected from different portions of the watershed in order to detect spatial variability in the locations and amounts of stored sediment and to assess long-term sediment transport. Additionally, we assessed the present-day hydrology and sediment transport within the major sub-watershed areas in the SFNR watershed by establishing ten streamflow and suspended-sediment sampling locations. Data collected at these sampling stations were used to develop relations between discharge, suspended sediment load, suspended sediment concentration, turbidity, and other hydrologic parameters. Total suspended sediment loads calculated for each sampling station are used to assess present-day sediment transport through the watershed.

The total volume of post-logging sediment (active channel and historic terrace) in storage over the entire study area is estimated at 225,000 yds^3 or approximately 22,000 yds^3/mile. Comparison of the volume associated with historic terraces and the volume associated with the active channel indicates that a large portion of the sediment originally deposited beneath historic terraces has been eroded and transported downstream. A significant portion of this sediment presently is stored in the lower SFNR channel between its confluence with the North Fork of the SFNR and the mouth of the SFNR.

Present-day suspended sediment loads computed for each sampling station ranged from 14 to 684 tons. Overall, most sites produced sediment at a fairly consistent rate with discharge, although a large increase in sediment transport occurred between the mouth of the North Fork of the SFNR and Kass Creek. The sediment source for this increase in suspended sediment transport is the large amount of sediment stored in the active channel along this reach.

This research shows that sediment trapped in long-term storage along the SFNR channel is transported downstream in high-discharge events. This sediment increases the overall suspended sediment load and can lead to an overestimation of the sediment generated by upslope management practices. The data produced in this study can be used in the future to monitor sediment transport through the SFNR watershed and to assess the recovery of the SFNR channel from past logging sediment inputs.

We recommend that future sediment transport studies designed to assess the sediment contribution from upslope forest management include an assessment of in-channel storage and transport. A clear understanding of the distinction between these two sediment sources is necessary to properly evaluate sediment budget analyses.